WHAT IS CLAIMED

1. In a lens distortion factor calculating apparatus for subjecting an image picked up by image pick-up means having a lens to lens distortion correction, the lens distortion factor calculating apparatus comprises:

first means for finding, on the basis of two images picked up by the image pick-up means, the coordinates of a plurality of corresponding points between the images;

second means for calculating, on the basis of the coordinates of the corresponding points found by the first means, geometric transform factors between said two images; and

third means for calculating, on the basis of the coordinates of the corresponding points found by the first means and the geometric transform factors found by the second means, a lens distortion factor.

2. The lens distortion factor calculating apparatus according to claim 1, characterized in that the first means comprises

means for extracting an overlapped portion of the two images picked up by the image pick-up means,

means for extracting, from the overlapped portion of one of the images with the other image,

33

a plurality of partial images effective for tracking by an optical flow between both the images as feature points, and

means for tracking a point, which corresponds to each of the feature points on the one image, on the other image on the basis of the optical flow between both the images.

3. In a lens distortion factor calculating method for subjecting an image picked up by image pick-up means having a lens to lens distortion correction, the lens distortion factor calculating method comprises:

a first step of finding, on the basis of two images picked up by the image pick-up means, the coordinates of a plurality of corresponding points between the images;

a second step of calculating, on the basis of the coordinates of the corresponding points found in the first step, geometric transform factors between said two images; and

a third step of calculating, on the basis of the coordinates of the corresponding points found in the first step and the geometric transform factors found in the second step, a lens distortion factor.

4. The lens distortion factor calculating

34

method according to claim 3, characterized in that the first step comprises the steps of

extracting an overlapped portion of the two images picked up by the image pick-up means,

extracting, from the overlapped portion of one of the images with the other image, a plurality of partial images effective for tracking by an optical flow between both the images as feature points, and

tracking a point, which corresponds to each of the feature points on the one image, of the other image on the basis of the optical flow between both the images.

5. A computer readable recording medium having a lens distortion factor calculation program for subjecting an image picked up by image pick-up means having a lens to lens distortion correction recorded thereon, wherein the lens distortion factor calculation program causes a computer to carry out:

a first step of finding, on the basis of two images picked up by the image pick-up means, the coordinates of a plurality of corresponding points between the images;

a second step of calculating, on the basis of the coordinates of the corresponding points found in the first step, geometric transform factors

between said two images; and

a third step of calculating, on the basis of the
coordinates of the corresponding points found in the
first step and the geometric transform factors found
in the second step, a lens distortion factor.

6.   The computer readable recording medium
having the lens distortion factor calculation
program recorded thereon according to claim 5,
characterized in that the first step comprises the
steps of

extracting an overlapped portion of the two
images picked up by the image pick-up means,

extracting, from the overlapped portion of one
of the images with the other image, a plurality of
partial images effective for tracking by an optical
flow between both the images as feature points, and

tracking a point, which corresponds to each of
the feature points on the one image, on the other
image on the basis of the optical flow between both
the images.

7. In an image constructor for combining a first
image and a second image which are picked up by image
pick-up means having a lens, the image constructor
comprises:

first means for finding, on the basis of the

first image and the second image, the coordinates
of a plurality of corresponding points between the
images;

second means for calculating, on the basis of
the coordinates of the corresponding points found
by the first means, geometric transform factors
between the first image and the second image;

third means for calculating, on the basis of the
coordinates of the corresponding points found by the
first means and the geometric transform factors
found by the second means, a lens distortion factor;

fourth means for subjecting the first image and
the second image to lens distortion correction on
the basis of the lens distortion factor calculated
by the third means; and

fifth means for combining the first image and
the second image, which have been subjected to the
lens distortion correction, obtained by the fourth
means using the geometric transform factors between
the first image and the second image which have been
subjected to the lens distortion correction.

8. The image constructor according to claim 7,
characterized in that the first means comprises

means for extracting an overlapped portion of
the first image and the second image,

means for extracting, from the overlapped portion of one of the images with the other image, a plurality of partial images effective for tracking by an optical flow between both the images as feature points, and

means for tracking a point, which corresponds to each of the feature points on the one image, on the other image on the basis of the optical flow between both the images.

9. In an image constructing method for combining a first image and a second image which are picked up by image pick-up means having a lens, the image constructing method comprises:

a first step of finding, on the basis of the first image and the second image, the coordinates of a plurality of corresponding points between the images;

a second step of calculating, on the basis of the coordinates of the corresponding points found in the first step, geometric transform factors between the first image and the second image;

a third step of calculating, on the basis of the coordinates of the corresponding points found in the first step and the geometric transform factors found in the second step, a lens distortion factor;

38

a fourth step of subjecting the first image and the second image to lens distortion correction on the basis of the lens distortion factor calculated in the third step; and

a fifth step of combining the first image and the second image, which have been subjected to the lens distortion correction, obtained in the fourth step using the geometric transform factor between the first image and the second image which have been subjected to the lens distortion correction.

10. The image constructing method according to claim 9, characterized in that the first step comprises the steps of

extracting an overlapped portion of the first image and the second image,

extracting, from the overlapped portion of one of the images with the other image, a plurality of partial images effective for tracking by an optical flow between both the images as feature points, and

tracking a point, which corresponds to each of the feature points on the one image, on the other image on the basis of the optical flow between both the images.

11. A computer readable recording medium having an image constructing program for combining

a first image and a second image which are picked up by image pick-up means having a lens recorded thereon, wherein the image constructing program causes a computer to carry out:

a first step of finding, on the basis of the first image and the second image, the coordinates of a plurality of corresponding points between the images;

a second step of calculating, on the basis of the coordinates of the corresponding points found in the first step, geometric transform factors between the first image and the second image;

a third step of calculating, on the basis of the coordinates of the corresponding points found in the first step and the geometric transform factors found in the second step, a lens distortion factor;

a fourth step of subjecting the first image and the second image to lens distortion correction on the basis of the lens distortion factor calculated in the third step; and

a fifth step of combining the first image and the second image, which have been subjected to the lens distortion correction, obtained in the fourth step using the geometric transform factors between the first image and the second image which have been

subjected to the lens distortion correction.

12. The computer readable recording medium having the image constructing program recorded thereon according to claim 11, characterized in that the first step comprises the steps of

extracting an overlapped portion of the first image and the second image,

extracting, from the overlapped portion of one of the images with the other image, a plurality of partial images effective for tracking by an optical flow between both the images as feature points, and

tracking a point, which corresponds to each of the feature points on the one image, on the other image on the basis of the optical flow between both the images.